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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,346	10/07/2002	Huageng Luo	RD28642-1	3990
6147	7590	06/29/2004	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 SCHENECTADY, NY 12309			SAINT SURIN, JACQUES M	
			ART UNIT	PAPER NUMBER
			2856	

DATE MAILED: 06/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/065,346

Applicant(s)

LUO ET AL.

Examiner

Jacques M Saint-Surin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2002 and 19 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 and 22 is/are rejected.
- 7) ☒ Claim(s) 21 and 23 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/07/02 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2 and 3.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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DETAILED ACTION

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6-13, 15-20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipated by Kirchner (US Patent 6,309,333).

Regarding claim 1, Kirchner ('333) discloses a vibration control system for a rotary machine having a rotor (Fig. 4a shows a deflection control system 100 for a roll 102 which includes an axle 104 having bearings 106 for supporting a roll shell 108 see: col. 8, lines 64-67), comprising:

a sensor disposed within the rotary machine for sensing vibration of the rotor (sensor 114 connected to the interior surface 110 of the roll shell 108, see: col. 9, lines 12-13);

a vibration damping device (piezoelectric actuators 116, see; col. 9, line 14) disposed within the rotary machine (102) for imparting a reaction force to the rotor (108); and

a controller arranged in operable communication with said sensor and said vibration damping device (the sensors 114 and piezoelectric actuators 116 are in signal sending and receiving communication with a controller 118 via conductive traces 120 extending between the sensors 114 and piezoelectric actuators 116 and the controller

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118, see: col. 9, lines 14-17) said controller (118) adapted to receive a sensor signal from said sensor (114) and to send a control signal to said vibration damping device (116) for damping the vibration of the rotor (108).

Regarding claims 2 and 11, Kirchner ('333) discloses because piezoelectric elements derive their motion through solid state crystal effects and have no moving parts the response time of piezoelectric elements is in the kilohertz range so that they may be activated at very high frequencies, see: col. 4, lines 48-53.

Regarding claims 3-4 and 12-13, Krichner discloses the piezoelectric actuator preferably includes a plurality of piezoelectric actuators that are provided in contact with the dynamic surface, see: col. 4, lines 54-56. Also, col. 5, lines 62-63 discloses the piezoelectric actuators are aligned in rows over the interior surface of the shell.

Regarding claims 6 and 20, Kirchner ('333) discloses piezoelectric actuator 116F may apply a counter vibrating force to the roll shell, and also piezoelectric actuators adjacent one another may apply counter vibrating forces having different magnitudes; e.g. the piezoelectric actuator underlying mass 125E applies a counter vibrating force having a greater magnitude than the force applied by the piezoelectric actuator underlying mass 125E', see: col. 11, lines 29-38.

Regarding claims 8 and 19, Kirchner ('333) discloses the controller 118 preferably includes a microprocessor 124 and a memory device 126 for storing a deflection control strategy or data related to preferred operating conditions for the roll 102 and roll shell 108; the controller 118 preferably uses one or more software applications stored therein, the software applications being capable of receiving feedback signals from the sensors 114, comparing the feedback signals with data

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stored in the memory device 126 and generating a series of output signals for transmission to the piezoelectric actuators 116, see: col. 9, lines 36-50). The microprocessor 124 inherently includes the analog to digital converter for converting the analog signal to digital before processing and the digital to analog converter for converting the digital signal to analog signal before outputting the processed signals. In addition, the memory may have stored therein look-up tables, a control strategy algorithm and/or an adaptive feedback control strategy algorithm (see: col. 6, lines 15-17).

Regarding claim 9, Kirchner ('333) discloses the ratio of masses and piezoelectric actuators to sensors is approximately 100:1, see: col. 11, lines 3-4.

Regarding claims 10 and 15-16, as discussed above, they are rejected for the reasons set forth for claim 1. Furthermore, Kirchner discloses upon receiving the output signals from the controller, piezoelectric actuators 116 will exert tensile and/or compression forces on the dynamic surface of the roll for damping and/or controlling vibration of the dynamic surface (col. 12, lines 28-32). Fig. 4a of Kirchner shows roll 102 includes an axle 104 having bearings 106 for supporting a roll shell 108 which is generally cylindrical or tubular and includes an inner surface 110 defining an inner diameter and an exterior surface 112 defining an outer diameter 9see: col. 8, lines 66-67 and col. 9, lines 6-10).

Regarding claim 17, as discussed above, Kirchner discloses sensor 114, piezoelectric actuator 114 and controller 118.

Regarding claim 18, as discussed above, the sensors 114 and piezoelectric actuators 116 are in signal sending and receiving communication with a controller 118

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via conductive traces 120 extending between the sensors 114 and piezoelectric actuators 116 and the controller 118, see: col. 9, lines 14-17.

Regarding claim 22, Kirchner ('333) discloses piezoelectric actuator 116F may apply a counter vibrating force to the roll shell, and also piezoelectric actuators adjacent one another may apply counter vibrating forces having different magnitudes; e.g. the piezoelectric actuator underlying mass 125E applies a counter vibrating force having a greater magnitude than the force applied by the piezoelectric actuator underlying mass 125E', see: col. 11, lines 29-38.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kirchner (US Patent 6,309,333) in view of Teel (US Patent 4,972,389).

These claims differ from Kirchner by reciting said piezoelectric actuator is made of a material selected from the group consisting of; lead-zirconate-titanate, lead-titanate, lead-zirconate, and barium-titanate. Teel discloses piezoelectric elements 26 are formed from a suitable well known ceramic crystal material such as barium-titanate or lead-zirconate-titanate, see: col. 3, lines 62-64. It would have been obvious to one having ordinary skill in the art at the time of the

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invention to utilize in Kirchner the piezoelectric element of Teel because it would provide a damping device having a material including on the opposite plane surfaces electrodes formed as a conductive coating of silver or a silver compound thereby obtaining a reliable damping for the vibration control.

***Allowable Subject Matter***

5. Claims 21 and 23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Wakui (US Patent 6,378,672) discloses an active vibration isolation device and its control device.

Kirchner (US Patent 6,361,483) discloses a system for controlling vibration of a dynamic surface.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacques M Saint-Surin whose telephone number is (571) 272-2206. The examiner can normally be reached on Monday-Friday.

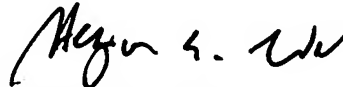
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jacques M. Saint-Surin  
June 28, 2004



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